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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/893,917	07/11/1997	KARL A. LITTAU	AM2119/T2130	8435
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APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			ZERVIGON, RUDY	
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DATE MAILED: 07/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	08/893,917	LITTAU ET AL.
	Examiner Rudy Zervigon	Art Unit 1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 31 March 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 8-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 8-20 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 11 July 1997 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____

DETAILED ACTION

1. In view of the decision by the Board of Patent Appeals and Interferences on March 31, 2005 and January 3, 2004, the rejection of claims 1-7 and 21 were affirmed by the Board of Patent Appeals and Interferences. The rejection of claims 8-20 were reversed by the Board of Patent Appeals and Interferences. As a result, the pending claims of the Application are claims 8-20.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 16-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 16-19 recite the limitation "said outlet aperture" in claim 16. There is insufficient antecedent basis for this limitation in the claim.

5. Claims 16-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 requires "from said outlet". It is uncertain which of said many outlets Applicant refers.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "a pump system in fluid

communication therewith" must be shown or the feature canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 8-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Shang; Quanyuan et al. (US 5,788,778 A). Shang teaches:

“A substrate processing apparatus (Figure 1; column 4; line 4 – column 5; line 38) having a process chamber (10; Figure 1), said apparatus, comprising: means for forming a plasma remotely with respect to said chamber (10; Figure 1), said plasma including a plurality of reactive radicals (“plasma”; where cited)” – claim 8:

Support for this portion of claim 8 is found in Section III (line 26, page 17 – page 18, line 5). Specifically, the specification teaches a plasma source 300 of Figure 3, where an “exemplary plasma source” would include a plasma applicator 302 in fluid communication with a fluorine gas supply 304 and a processing chamber 15. Specifically, the production of the remote plasma is by the plasma source “microwave generator, such as magnetron 306” which provides the power imparted to the fluorine gas supply 304. Shang teaches an equivalent apparatus that performs the function of “forming the plasma” by teaching a “microwave generator” (48; Figure 1) and plasma applicator (46; Figure 1). As a result, Shang’s prior art elements of “microwave generator” (48; Figure 1) and plasma applicator (46; Figure 1) perform the identical function of “forming the plasma” in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Shang further teaches:

“means, in fluid communication with said means for forming a plasma, for forming a flow of said reactive radicals traversing toward said chamber” – claim 8:

Support for this portion of claim 8 is found in Section III (lines 13-16, page 18). Specifically, the specification teaches a reactive gas supply 304 is flowed, under vacuum from the substrate processing chamber’s pumping and exhaust system, into the plasma applicator 302 where microwave energy transmitted from a microwave generator. Shang teaches a reactive gas supply

(52,44; Figure 1) is flowed, under vacuum from the substrate processing chamber's pumping and exhaust system (36), into the plasma applicator 46 where microwave energy is transmitted from a microwave generator 48. As such, Shang teaches an equivalent apparatus that performs the function of forming a flow of reactive radicals traversing toward the chamber 10 that is in fluid communication with said means for forming a plasma (as above). As a result, Shang's prior art elements of a reactive gas supply (52,44; Figure 1), pumping and exhaust system (36), and means for forming a plasma perform the identical function of "fluid communication means" for forming a flow of reactive radicals traversing toward the chamber in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Shang further teaches:

"means for forming a nonplasma diluent gas flow" – claim 8

Support for this portion of claim 8 is found in Section III (lines 21-23, page 18). Specifically, the specification teaches inlet 324 of the mixing manifold 322 is coupled to receive a flow, under vacuum, of diluent gas from the diluent gas supply 326. Shang teaches an inlet (33/57 interface) of the mixing manifold (33) is coupled to receive a flow, under vacuum (see above), of gas from gas supplies (32; Figure 1). As such, Shang teaches an equivalent apparatus that performs the function of forming a nonplasma diluent gas flow. As a result, Shang's prior art elements of inlet piping, mixing manifold (33), and gas sources (32) performs the identical function of forming a nonplasma diluent gas flow in substantially the same way and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Shang further teaches:

- i. Means, in fluid communication with said means for forming a flow of said reactive radicals and with said means for forming a diluent gas flow, for mixing said flow of said reactive radicals and said diluent gas flow downstream of said means for forming a plasma and anterior to said chamber to form a gas-radical mixture; and – claim 8
- ii. Means, in fluid communication with said means for mixing, for flowing said gas-radical mixture into said chamber – claim 8

Support for this portion of claim 8 is found in Section III (lines 25-30, page 18). Specifically, the specification teaches a mixing manifold 322 is provided so that a flow of diluent gas may be mixed with a flow of reactive radicals. Shang teaches a mixing manifold (33) is provided so that a flow of gas (32) may be mixed with a flow of reactive radicals (from 46) downstream of the means for forming a plasma (as above). As such, Shang teaches an equivalent apparatus that performs the function of mixing reactive radicals and diluent gas flow downstream of said means for forming a plasma and anterior to the chamber to form a gas-radical mixture. As a result, Shang's prior art elements of mixing manifold (33), flow of gas (32), and flow of reactive radicals (from 46) perform the identical function of mixing reactive radicals and gas flow downstream of the means for forming a plasma (as above) and anterior to the chamber to form a gas-radical mixture in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Shang further teaches:

- iii. The apparatus as recited in claim 8 wherein said means for forming a diluent gas flow includes a supply of diluent gas and a pump system (36; Figure 1) in fluid communication therewith, with said supply of diluent gas comprising a nonplasma inert

gas, as claimed by claim 9. Applicant's claim limitations concerning "diluent gas flow", and "inert gas" are claim limitations of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- iv. The apparatus as recited in claim 8 wherein said diluent gas flow travels at a first rate and said flow of said reactive radicals travel at a second rate with a ratio of said first rate to said second rate being at least 2:1, as claimed by claim 10. Applicant's claim limitations concerning "diluent gas flow", "inert gas", and relative flow rates of gases are claim limitations of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). It is noted in

advance that that Shang teaches apparatus components (34, 53, and 50; Figure 1) capable of generating flows with relative flow rates.

- v. The apparatus as recited in claim 9 wherein said supply of diluent gas comprises a reducing gas, as claimed by claim 11. Applicant's claim limitations concerning "comprises a reducing gas" is a claim limitation of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- vi. The apparatus as recited in claim 8 wherein said means for forming a plasma includes a plasma applicator (46; Figure 1) defining an internal volume and a supply of reactive gas (52,44; Figure 1) in fluid communication with said internal volume, with said supply of reactive gas being selected from a group consisting of NF₃, dilute F₂, CF₄, C₂F₆, C₃F₈, SF₆, and ClF₃, as claimed by claim 12. Applicant's claim limitation concerning reactive gas identity is a claim limitation of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must

result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- vii. The apparatus as recited in claim 12 wherein said plasma applicator (46; Figure 1) includes a microwave source (column 4; lines 53-63) in electrical communication with said plasma applicator (46; Figure 1), as claimed by claim 13
- viii. The apparatus as recited in claim 9 wherein said pump system (36) maintains a pressure within said chamber (10; Figure 1) below one torr (column 5; lines 8-14), as claimed by claim 14
- ix. The apparatus as recited in claim 9 wherein said inert gas is argon, as claimed by claim 15. Applicant's claim limitation concerning gas identity is a claim limitation of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shang; Quanyuan et al. (US 5,788,778 A) in view of Izu; Masatsugu et al. (US 5,411,591 A) and Felts; John T. et al. (US 4,888,199 A). Shang is discussed above. Shang further teaches:

- i. A substrate processing apparatus (Figure 1; column 4; line 4 – column 5; line 38), comprising: a processing chamber (10) having an intake port (12/33 interface); a supply of nonplasma diluent gas (32); a plasma source (48, 46, 53, 50, 52, 44; Figure 1) for generating a plasma consisting of reactive radicals, said plasma source (48, 46, 53, 50, 52, 44; Figure 1) including a conductive plasma applicator (46; Figure 1) defining an internal volume, said applicator (46; Figure 1) having an input aperture (inlet(s) to 46; Figure 1) and an output aperture (output from 46; Figure 1); a mixing manifold (33/57 interface; Figure 1) having multiple inlets and an outlet with said outlet being coupled to said intake port (12/33 interface) and one of said inlets being in fluid communication with said outlet aperture (“output aperture” (output from 46; Figure 1)) of said conductive plasma applicator (46; Figure 1), with the remaining inlets being in fluid communication with said supply of diluent gas (32); a pump system (36), in fluid communication with both said plasma source (48, 46, 53, 50, 52, 44; Figure 1) and said supply of diluent gas (32), to create a diluent gas flow (32) and a flow of said reactive radicals (output of 46),

with said flow of said reactive radicals traversing said output aperture (output from 46; Figure 1) toward said mixing manifold (33/57 interface; Figure 1) and said flow of gas traveling from said supply to said mixing manifold (33/57 interface; Figure 1), with said diluent gas (32) flow and said flow of said reactive radicals (from 57) combining when traveling between said inlets and said outlet forming a gas-radical mixture egressing from said outlet and traversing through said intake port (12/33 interface) – claim 16

Shang further teaches:

- i. The apparatus of claim 16 wherein said first rate is in the range of 200 and 400 sccm and said second rate is in the range of 500 and 800 sccm, as claimed by claim 17. Applicant's claim limitations concerning specific flow rates of gases are claim limitations of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). It is noted in advance that that Shang teaches apparatus components (34, 53, and 50; Figure 1) capable of generating flows with relative flow rates.
- ii. The apparatus of claim 16 further including a microwave source (48; Figure 1) in electrical communication with a plasma applicator (46; Figure 1) - claim 19

Shang does not teach:

- i. an input aperture (inlet(s) to 46; Figure 1) and an output aperture (output from 46; Figure 1), each of which is equipped with microwave arrestors – claim 16
- ii. a controller configured to regulate said pump system and said plasma source (48, 46, 53, 50, 52, 44; Figure 1); a memory, coupled to said controller, comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of said substrate processing system, said computer-readable program including a set of computer instructions to be operated on by said controller to regulate the introduction of said radicals from said plasma into said mixing manifold (33/57 interface; Figure 1), said set of computer instructions including: a first subroutine to be operated on by said controller to regulate said pump system to introduce said reactive radicals into said mixing manifold (33/57 interface; Figure 1) at a first rate and said diluent gas (32) at a second rate so as to maintain a pressure with said chamber less than one torr – claim 16
- iii. The apparatus of claim 16 further including a gas delivery system in fluid communication with said plasma applicator (46; Figure 1) to transmit a reactive gas thereto, with said controller being configured to regulate gas delivery system, wherein said set of computer instructions further includes a second subroutine instructions to be operated on by said controller to regulate said gas delivery system to introduce said reactive gas at a first rate to said gas inlet during a first time period at a first flow rate; a third subroutine of computer instructions for controlling said pump system to maintain a pressure of about 1-20 torr within said applicator (46; Figure 1) during said first time period, as claimed by claim 18

- iv. The apparatus of claim 16 further including a microwave source in electrical communication with said plasma applicator (46; Figure 1), with said controller being configured to regulate said microwave source, wherein said set of computer instructions further includes a fourth subroutine to be operated on by said controller to regulate said microwave source to direct microwaves into said internal volume of said applicator (46; Figure 1) during said first time period, as claimed by claim 19
- v. The apparatus of claim 19 wherein said fourth subset of computer instructions controls said remote microwave plasma system to direct said microwave energy at a power level ranging from about 150-500 W to ignite said plasma in said applicator (46; Figure 1), as claimed by claim 20

Izu teaches a microwave arrestor (150; Figure 7; column 10; lines 50-60) for use in microwave plasma apparatus (column 7; lines 25-43).

Felts teaches a plasma processing apparatus (Figure 1) including:

- vi. a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60) configured to regulate a pump system (15, 19, 25; Figure 1,2; column 3, line 50 - column 4, line 60) and a plasma source (17, 25; Figure 1,2); a memory (column 16 - column 46), coupled to a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60), comprising a computer-readable medium (column 16 - column 46) having a computer-readable program (column 16 - column 46) embodied therein for directing operation (column 6; lines 8-35) of a substrate processing system (Figure 1,2), a computer-readable program (column 16 - column 46) including a set of computer instructions (column 16 - column 46) to be operated on by a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60) to

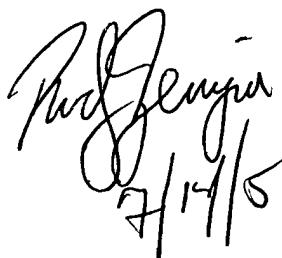
regulate the introduction of a radicals, a set of computer instructions (column 16 - column 46) including: a first subroutine to be operated on by a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60) to regulate a pump system (15, 19, 25; Figure 1,2; column 3, line 50 - column 4, line 60) to introduce a reactive radicals at a first rate ("desired controlled flow" - column 5; lines 17-40) and a gas at a second rate ("desired controlled flow" - column 5; lines 17-40) so as to maintain a pressure with a chamber less than one torr (column 4; lines 32-48) – claim 16

vii. The apparatus of claim 16 further including a gas delivery system (67,65,75,73,15; Figure 1,2) in fluid communication with a plasma applicator (17; Figure 1,2) to transmit a reactive gas thereto, with a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60) being configured to regulate gas delivery system (67,65,75,73,15; Figure 1,2), wherein a set of computer instructions (column 16 - column 46) further includes a second subroutine instructions (column 16 - column 46) to be operated ("desired controlled flow" - column 5; lines 17-40) on by a controller (25; Figure 1,2; column 3, line 50 - column 4, line 60) to regulate a gas delivery system (67,65,75,73,15; Figure 1,2) to introduce a reactive gas at a first rate ("desired controlled flow" - column 5; lines 17-40) to a gas inlet during a first time period at a first flow rate ("desired controlled flow" - column 5; lines 17-40); a third subroutine of computer instructions (column 16 - column 46) for controlling a pump system (15, 19, 25; Figure 1,2; column 3, line 50 - column 4, line 60) to maintain a pressure of about 1-20 torr (column 4; lines 32-48) within a applicator (17; Figure 1,2) during a first time period, as claimed by claim 18 – Applicant's "time periods" are claim limitations of intended use of the pending apparatus

limitations. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Izu's microwave arrestor and Felts' process controller to Shang's apparatus.

Motivation to add Izu's microwave arrestor and Felts' process controller to Shang's apparatus is for controlling the density of microwave generated plasma as taught by Izu (column 10, lines 50-55) and for dynamic plasma process control as taught by Felts (column 9; line 36 – column 10; line 65). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).



7/17/15